

Appl. No. 10/080,883
Amdt. dated June 25, 2004
Reply to Office Action of March 29, 2004

REMARKS/ARGUMENTS

Claims 1, 3 - 6, 9 - 13, 52, 54, 55 and 58 - 60 remain in the application for consideration.

Claims 14 - 51 and 61 - 91 have been canceled without prejudice pursuant to the requirement for restriction/election of species.

Reconsideration of the application is requested in view of the amendments made in the claims and the statements appearing below herein.

1. The requirement for restriction/species election has been made final. Claims 14 - 51 and 61 - 91 have been canceled without prejudice to the right of applicants under 35 U.S.C. § 121 to file a divisional application directed to these claims.

2. Claim 1 has been amended to incorporate herein the subject matter originally recited in claim 2 which has now been canceled.

Claim 6 has been amended to incorporate the subject matter originally recited in claims 7 and 8, both of which have now been canceled.

Claim 52 has been amended to incorporate therein the subject matter originally recited in claim 53 which has now been canceled.

Claim 55 has been amended to incorporate therein the subject matter originally recited in claims 56 and 57, both of which have now been canceled.

Appl. No. 10/080,883
Amdt. dated June 25, 2004
Reply to Office Action of March 29, 2004

3. Claims 1 - 3, 52 and 53 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent Application Publication No. US 2002/0105573 A1 ("Fujimoto et al.") in view of U.S. Patent 5,729,274 ("Sato").

Claim 1, as amended, is drawn to a thermal printer having a plurality of thermal print heads and dot size varying means, wherein a first one of the plurality of thermal print heads has a first number of thermal elements that is energizable at a first rate, and a second one of the plurality of thermal print heads has a second number of thermal elements that is energizable at a second rate, the first number being different than the second number, the first rate being different from the second rate.

Claim 52, as amended, is drawn to a method for use in a thermal printer having a plurality of thermal print heads. The method includes the step of varying sizes of dots printed by the plurality of print heads wherein one of the print heads has a first number of thermal elements and a second print heads has a second number of thermal elements, the first number being different than the second number. The method further includes the steps of energizing the first one of the print heads at a first rate and energizing the second one of the print heads at a second rate, with the first and second rates differing from each other.

Appl. No. 10/080,883
Amdt. dated June 25, 2004
Reply to Office Action of March 29, 2004

The references, viewed individually or in combination, do not teach or suggest within the meaning of 35 U.S.C. § 103 the thermal printer and method recited in claims 1 and 52.

Fujimoto et al. is drawn to a thermal printer including a thermal print head and a controller. The thermal print head has an array of heating regions arranged in a primary scanning direction and a driver for selectively heating the heating regions. The controller is combined with the driver for causing each of the heating regions to selectively form on a recording material differently sized print dots which include an off-dot, a maximum-size dot and at least one intermediate-size dot.

As acknowledged by the examiner, this reference does not teach a printer having a plurality of thermal print heads wherein a first one of the plurality of thermal print heads has a first number of thermal elements that is energizable at a first rate, wherein a second one of the plurality of thermal print heads has a second number of thermal elements that is energizable at a second rate, the first number being different than the second number, the first rate being different from the second rate.

The secondary reference, Sato, does not provide the teaching which is lacking in Fujimoto et al. and does not render the rejection any more effective. Sato discloses a thermal printer which has three thermal

Appl. No.. 10/080,883
Amdt. dated June 25, 2004
Reply to Office Action of March 29, 2004

print heads which are operable to print one of a plurality of colors. At least two of the three heads are driven in time sharing fashion (column 2, lines 20 - 22). Nowhere in Sato is there any teaching or suggestion that one of the thermal print heads has a first number of thermal elements and another of the print heads has a second number of thermal elements, the first and second numbers of elements being different. At column 3, lines 36 -38, the reference states that "...the heating element array 20 has a plurality of heating elements 46a, 46b... arranged in a line...". The numeral "20" is used to designate the heating element array for all three print heads 13, 14 and 15 (see Fig. 1). There is no distinction made between the heating element arrays of the respective print heads.

Sato teaches outputting to the respective thermal print heads a variable drive voltage in accordance with the color to be printed by the particular print head. Varying the drive voltage to the print heads in accordance with the teaching of Sato does not teach or suggest energizing the thermal elements of the print heads at different rates.

Applicants' claimed thermal printer has a first thermal print head which has a first number of thermal elements and a second printer which has a second number of thermal elements. The first and second numbers of thermal elements are different from each other. The respective first and second numbers of thermal elements

Appl. No. 10/080,883
Amdt. dated June 25, 2004
Reply to Office Action of March 29, 2004

can be energized at different rates. Applicants' claimed method recites the step of energizing the first number of elements at a rate which is different than the rate at which the second number of elements are energized.

Thus, applicants have provided an advantageous printer and method which result in the colors printed being much less sensitive to registration artifacts as is described in the application. The references, viewed individually or in combination, do not teach or suggest the claimed printer and method of applicants.

Reconsideration of this ground of rejection and withdrawal thereof are respectfully requested.

4. Claim 4 has been rejected under 35 U.S.C. §103(a) as being unpatentable over Fujimoto et al. in view of Sato and further in view of U.S. Patent 6,106,173 ("Suzuki et al."). The Suzuki et al. reference has been cited to show the use of four thermal print heads, to print cyan, magenta, yellow and black, respectively, to form a full color image.

Applicants traverse this ground of rejection. Claim 4 is dependent on claim 1 and is patentably distinct over the disclosures of the references for the same reasons discussed above with respect to Fujimoto et al. and Sato and further, because Suzuki et al. does not teach or suggest the claimed subject matter.

Suzuki et al. teaches a thermal image-forming system which utilizes a plurality of thermal print heads

Appl. No. 10/080,883
Amdt. dated June 25, 2004
Reply to Office Action of March 29, 2004

to form the image. The reference makes no distinction between the respective thermal print heads. Thus, there is no suggestion to have one of the thermal print heads with a first number of thermal elements and another of the print heads with a second number of thermal elements, the first and second numbers of elements being different, and to energize the first and second numbers of thermal elements at different rates.

Reconsideration of this ground of rejection and withdrawal thereof are respectfully requested.

5. Claims 6 and 55 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Fujimoto et al. in view of U.S. Patent 6,537,410 B2 ("Arnost et al.).

Claim 6 has been amended to include the subject matter originally recited in claims 7 and 8 (now canceled). Claim 6 now recites dot size varying means and, further, that a first one of the plurality of thermal print heads has a first number of thermal elements that is energizable at a first rate, and a second one of the plurality of thermal print heads has a second number of thermal elements that is energizable at a second rate, the first number being different than the second number, the first rate being different from the second rate.

Claim 55 has been amended to include the subject matter originally recited in claims 56 and 57 (now

Appl. No. 10/080,883
Amdt. dated June 25, 2004
Reply to Office Action of March 29, 2004

canceled). Claim 55 now recites the step of varying sizes of dots printed by the thermal print heads and, further, that a first one of the plurality of thermal print heads has a first number of thermal elements and a second one of the plurality of thermal print heads has a second number of thermal elements the first number being different than the second number, and the steps of energizing the first number of thermal print heads at a first rate and the second number of thermal elements at a second rate, the first rate being different from the second rate.

Claims 6 and 55 are patentably distinguishable over the references for the same reasons discussed above with respect to Fujimoto et al. and, further, because Arnost et al. does not teach or suggest the claimed subject matter. Arnost et al. describes a thermal transfer recording system which, in one embodiment, utilizes a donor element having a layer of an amorphous dye in combination with a thermal solvent. The reference does not teach or suggest the subject matter of amended claims 6 and 55.

Reconsideration of this ground of rejection and withdrawal thereof are respectfully requested.

6. Claims 7 and 56 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Fujimoto et al. in view of Arnost et al. and Sato.

Appl. No. 10/080,883
Amdt. dated June 25, 2004
Reply to Office Action of March 29, 2004

This ground of rejection is moot since the subject matter originally recited in claims 7 and 56 has been incorporated in claims 6 and 55, respectively, and claims 7 and 56 have been canceled. The patentability of amended claims 6 and 55 has been discussed in the preceding paragraph.

7. Claims 8 - 10 and 57 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Fujimoto et al. in view of Arnost et al. and Suzuki et al.

As discussed above, the subject matter of claim 8 (now canceled) has been incorporated into claim 6. Claims 9 and 10 are dependent, directly or indirectly, upon claim 6 and are patentably distinguishable for the same reasons discussed above with respect to Fujimoto et al., Arnost et al. and Suzuki et al.

The rejection of claim 57 is moot since this claim has been canceled and the subject matter of this claim has been incorporated into amended claim 55.

Reconsideration of this ground of rejection and withdrawal thereof are respectfully requested.

8. Claims 5, 11, 54 and 58 have been objected to as being dependent upon a rejected base claim. The examiner has stated that these claims would be allowable if rewritten in independent form. The parent claims, as amended, of claims 5, 11, 54 and 58 have been shown to

Appl. No. 10/080,883
Amdt. dated June 25, 2004
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be recite patentable subject matter and therefore claims 5, 11, 54 and 58 are patentable in their present form.

9. Applicants note the allowance of claims 12, 13, 59 and 60.

In summary, claims 1, 3 - 6, 9 - 13, 52, 54, 55 and 58 - 60, all the claims remaining in the application for consideration, have been shown to be patentably distinguishable over the references of record.

Reconsideration of the application and allowance of the claims are respectfully requested.

It is believed that no fee is due since the number of independent claims remaining are less than those originally paid for; however, if any additional fee is due, please charge our Deposit Account No. 16-2195. A duplicate copy of this paper is enclosed.

Respectfully submitted,



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Appl. No. 10/080,883
Amdt. dated June 25, 2004
Reply to Office Action of March 29, 2004

CERTIFICATE OF MAILING

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being deposited with the United States Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to Mail Stop Non-Fee Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Date: June 25, 2004



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